

# Updates on Spring Bread Wheat Breeding Program at ICARDA for the year 2017

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## Crosses

- More than 2500 simple and top crosses

## Evaluation of segregating generations

- 300 populations evaluated using the Terbol-Sids-Kulumsa-Merchuch/Terbol shuttle

## Production of doubled haploids (DH)

- 3 mapping populations each with 200 lines developed
- 1500-2000 DH lines produced

## Yield trials:

PYTs composed of 2000 genotypes and

700 elite genotypes assembled in the 1<sup>st</sup> year and 400 genotypes in the 2<sup>nd</sup> year

AYTs were evaluated across key locations.

## Genotyping:

501 elite genotypes have been genotyped using 15 K SNP

## Quality analysis

- NIR , Alveograph, Pharinograph analysis carried out for 501 elite genotypes

## Composing and distribution of International nurseries

IN for 2018 season composed and distributed on time

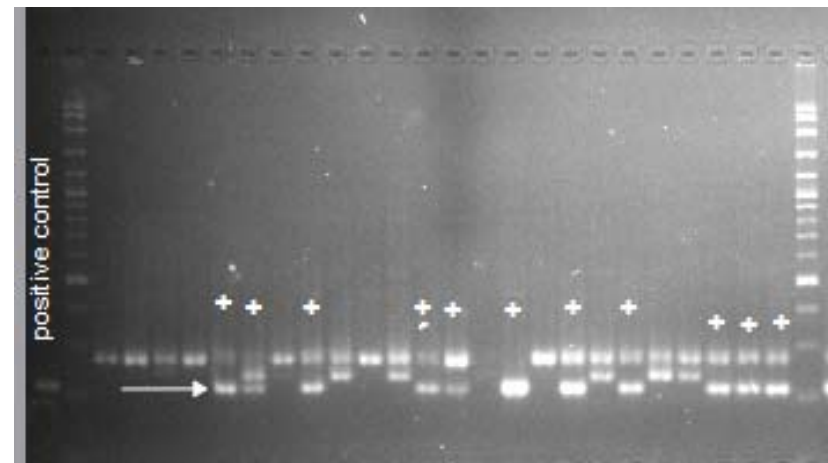
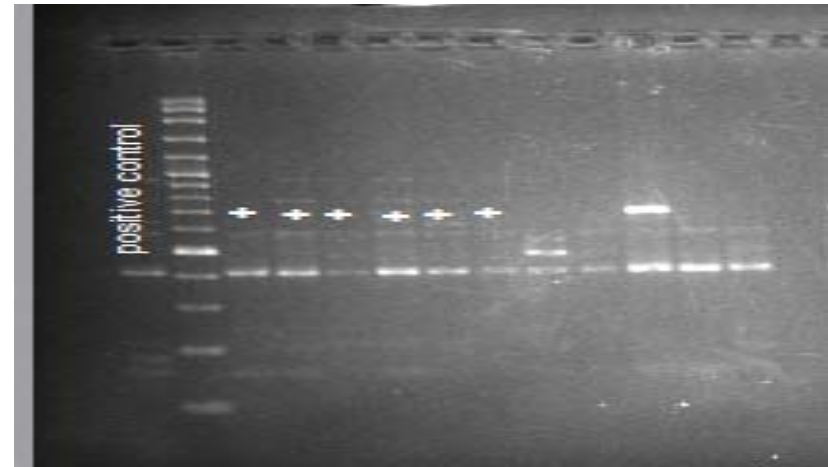
\* 5 varieties of ICARDA origin have been released in 2017



## Gene Pyramiding: MAS

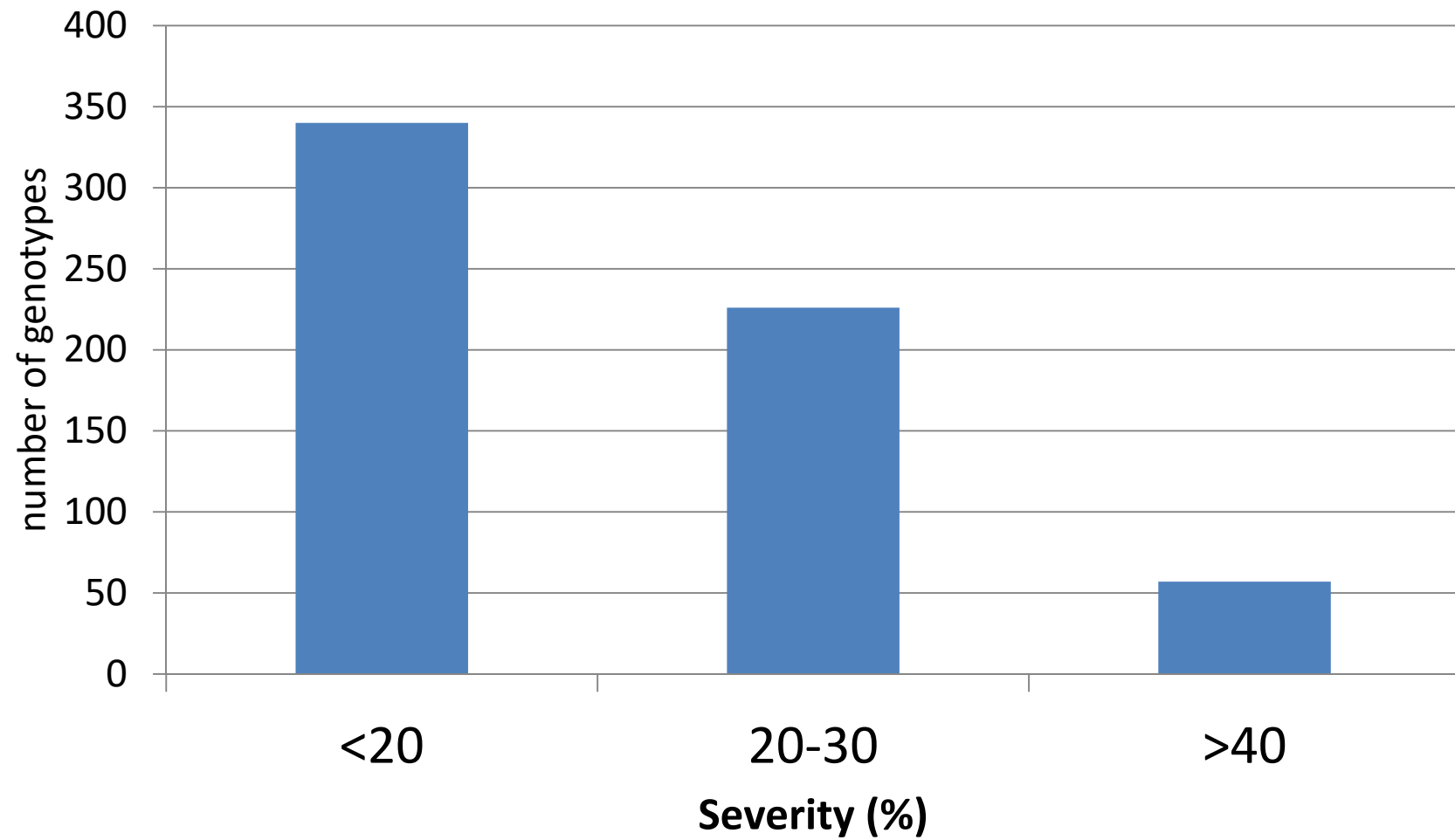
Characterization of crossing block and F2 populations carried out using functional markers.

Stem rust	Yellow rust	Leaf rust	Other Genes
<i>Pavon Sr 24+ Sr 31+Sr 50</i>	<i>Yr5, Yr45</i>	<i>Lr37</i>	<i>Stb4,</i>
<i>Sr 50+Sr 45 # 1</i>	<i>Yr10</i>	<i>Lr34</i>	<i>Tsn1</i>
<i>Sr 25</i>	<i>Yr15</i>	<i>Lr67</i>	<i>Cre1</i>
<i>Pavon Sr 24+ SR 26+Sr 31</i>	<i>Yr17</i>	<i>Lr10</i>	<i>Cre8</i>
<i>Sr 22/CO 1213</i>	<i>Yr 48</i>	<i>Lr14a</i>	<i>Fhb1</i>
<i>Westonia Sr 24+ Sr 26</i>	<i>Yr 5+10</i>	<i>Lr24</i>	<i>H5, H13, H22</i>
<i>Sr 33+Sr 45 #36</i>	<i>Yr5+10+15</i>	<i>Lr23</i>	<i>H23, H26</i>
<i>Angas Sr 32</i>	<i>Yr48+Yr15</i>	<i>Lr22a</i>	
<i>Sr 2</i>	<i>Yr17+Yr48</i>	<i>Lr25</i>	
<i>Sr 38</i>	<i>Yr27+5+10+15</i>	<i>Lr24+Sr24</i>	
<i>Sr 39</i>	<i>Yr36</i>	<i>Lr19+Sr24</i>	
other minor genes	other miner genes		



Genetic stocks from Dr Evans Lagudah

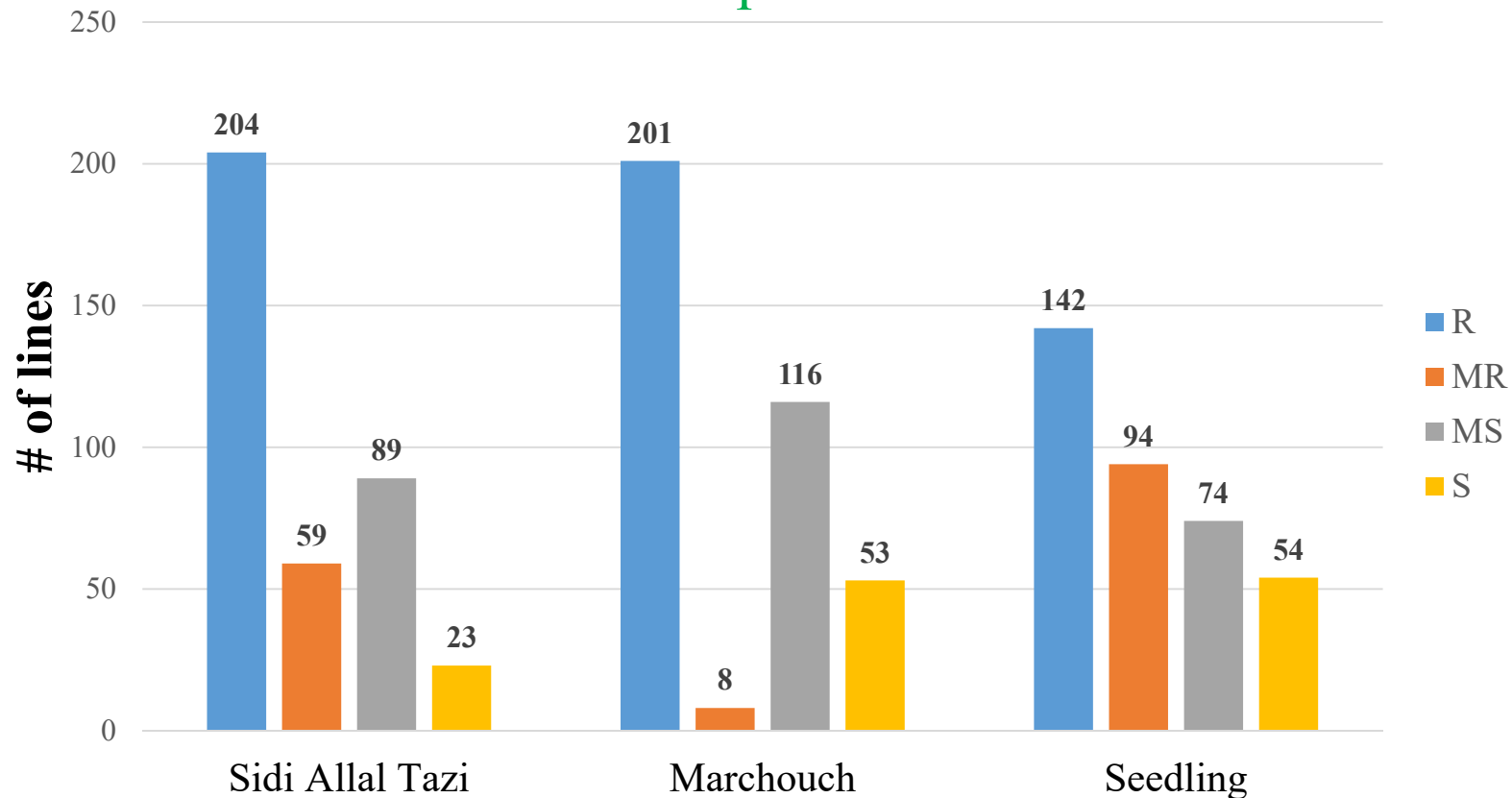
## Response of 623 spring bread wheat genotypes to yellow rust at Izmir, 2016/17



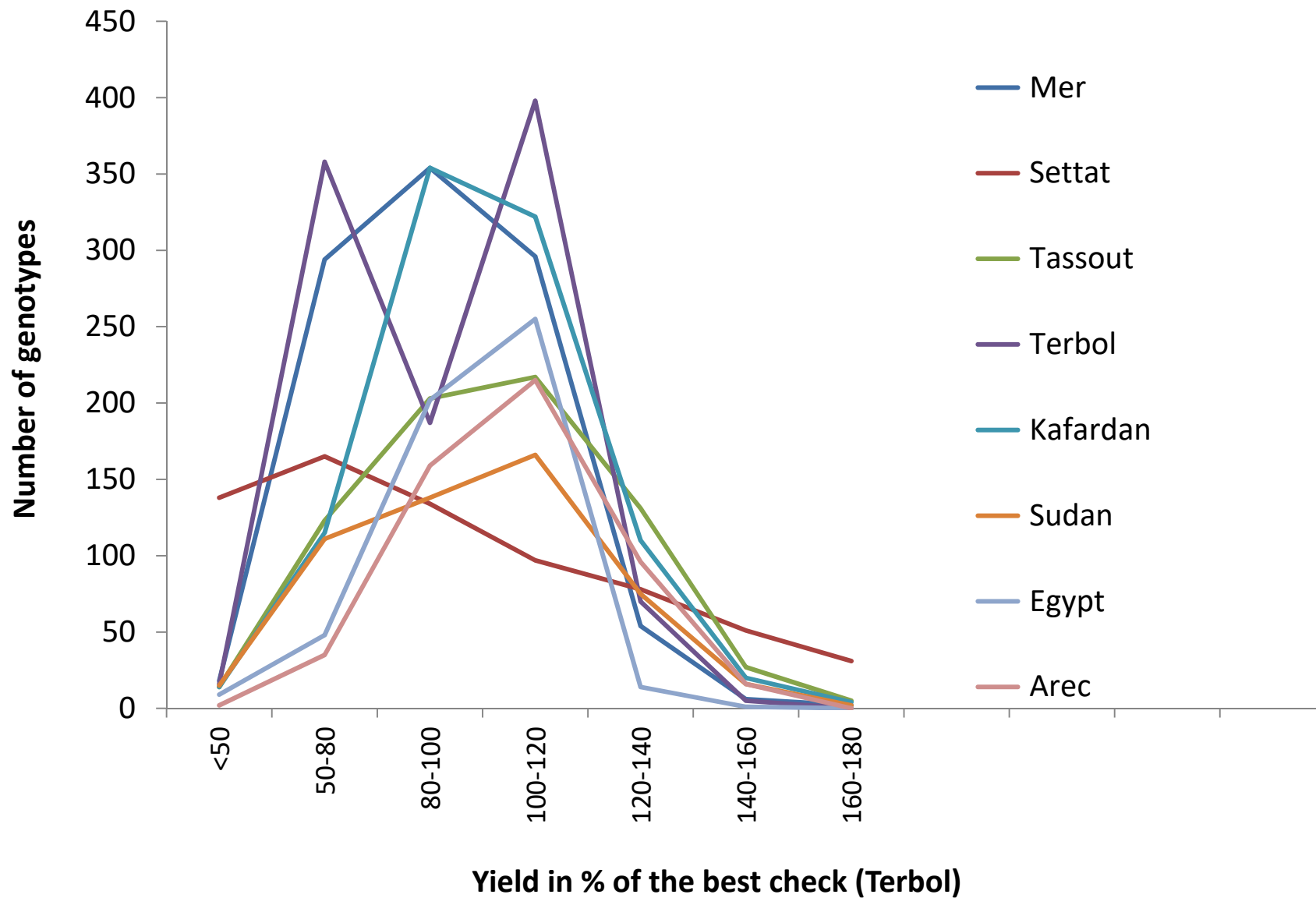
# Screening of 377 elite spring bread wheat genotypes

- With *Septoria tritici*
- Marchouch, Sidi Allal Tazi with artificial inoculation
- Seedling screening under controlled conditions
- Mixture of 10- isolates

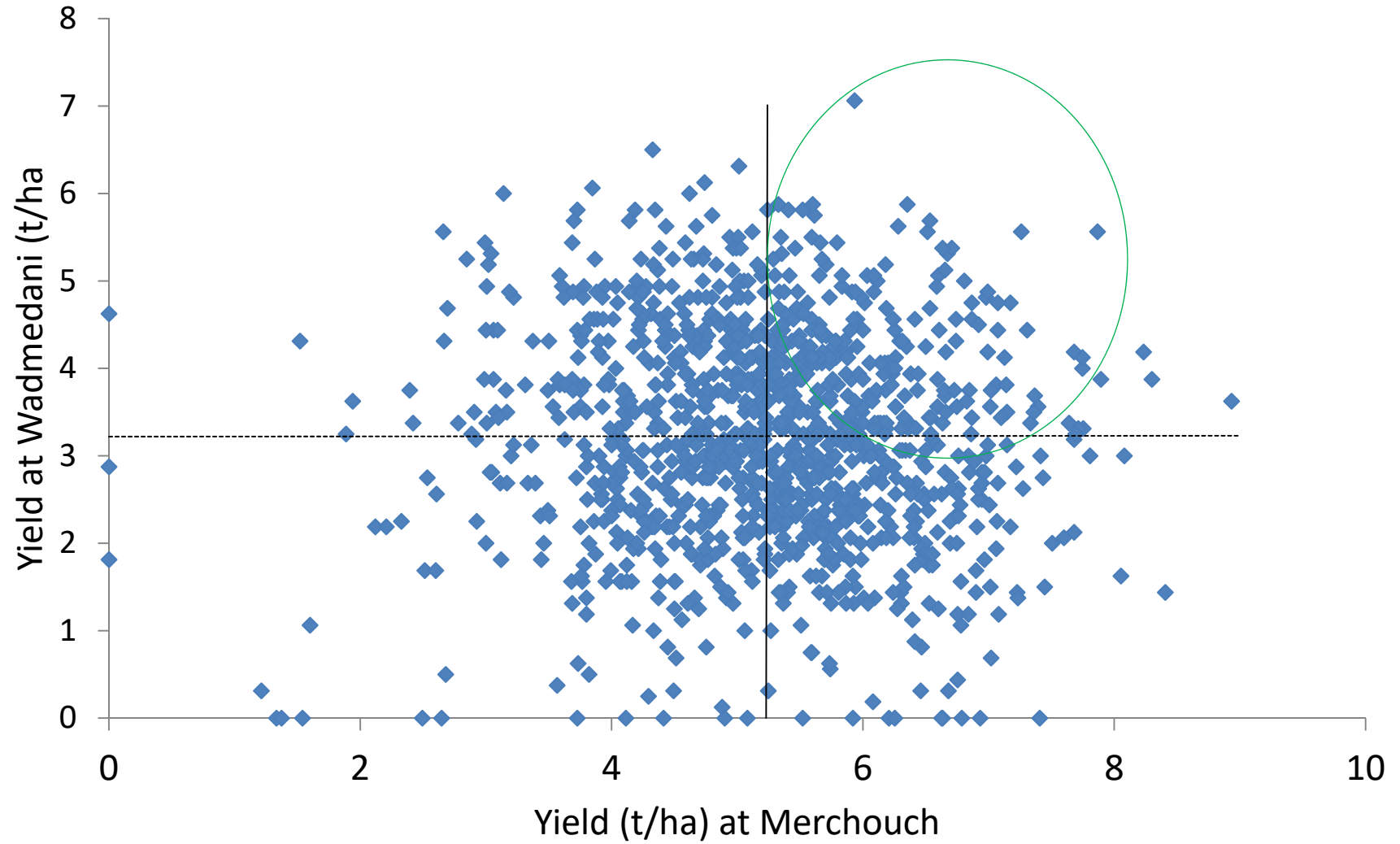
## Wheat - Septoria interaction



## Yield levels (% of best check) of spring bread wheat genotypes in AWYT across locations, 2017



# Wheat genotypes with drought and heat tolerance



## Distribution of International Nurseries and Yield Trials

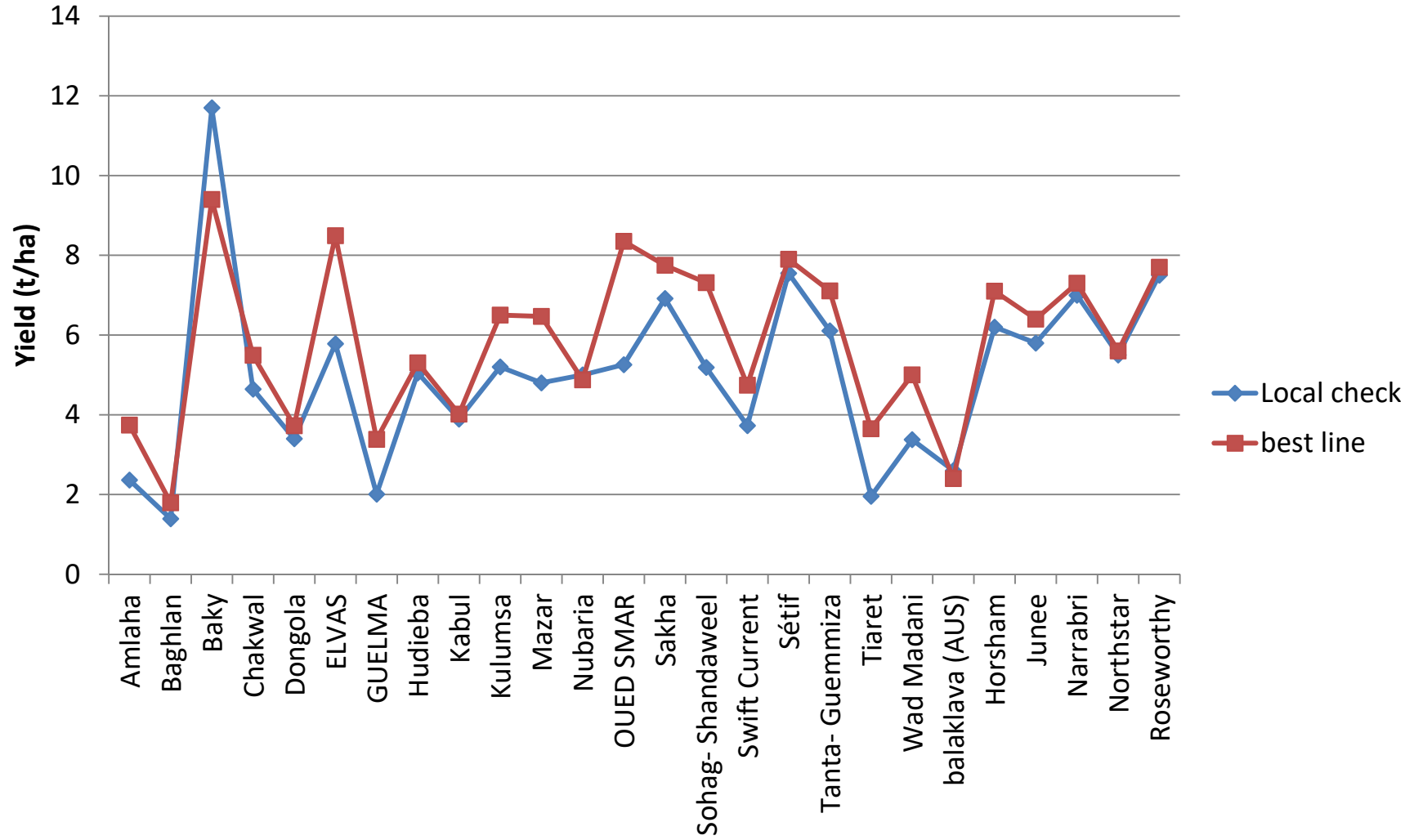
The following International nurseries and yield trials have been distributed from Terbol station, Lebanon to more than 30 countries in the CWANA and SSA regions and beyond upon request from the NARS .

1. Spring bread wheat observation nursery for CWANA (18<sup>th</sup> CWANA SBWON)
2. Spring bread wheat observation nursery for heat tolerance (18<sup>th</sup> HT-SBWON)
3. Spring bread wheat yield trial for HT( 18<sup>th</sup> ESBWYT-HT)
4. Spring bread wheat yield trial for dry-land environments (18<sup>th</sup> DSBWYT)
5. Elite spring bread wheat yield trial (18<sup>th</sup> ESBWYT)
6. Especial nursery for 12 countries in Sub Saharan Africa (AfDB project)
7. CIAGE nursery for 2018

[www.icarda.org/research-sub/international\\_nurseries](http://www.icarda.org/research-sub/international_nurseries)



**Grain yield performance of the best ICARDA line and the local check across locations in the 16<sup>th</sup> ESBWYT, 2016**



# Capacity building: short and long term trainings

## Short term training : Classical and Molecular Approaches in Wheat Breeding



## MSc & PhD Students

Name	Sex	Country	Degree	Study area
Sahar Bennani	F	Morocco	PhD	Drought tolerance
Samira El-Hanafi	F	Morocco	PhD	Hybrid wheat
Sawsan Tawkaz	F	Syria	PhD	DH
Kenza	F	Morocco	PhD	quality
Nawal	F	Algeria	PhD	Drought tolerance
Elfadil	M	Sudan	PhD	Heat stress
Tilahun Mekonnen	M	Ethiopia	PhD	Septoria
Assefa	M	Ethiopia	PhD	Heat and drought
Abera	M	Ethiopia	M.Sc	Yellow rust
Fikrte	F	Ethiopia	M.Sc.	Stem rust
Lakachew	M	Ethiopia	M.Sc.	septoria
Mathewos Ashamo	M	Ethiopia	PhD	Stem and leaf rust

# Publications in 2017

- *W. Tadesse, H. Halila, M. Jamal, S. El-Hanafi, S. Assefa, T.Oweis, and M. Baum. 2017. Role of sustainable wheat production to ensure food security in the cwana region. Journal of Experimental Biology and Agricultural Science DOI: [http://dx.doi.org/10.18006/2017.5\(Spl-1-SAFSAW\).S15.S32](http://dx.doi.org/10.18006/2017.5(Spl-1-SAFSAW).S15.S32)*
- *W. Tadesse, A. Amri, M. Sanchez-Garcia, M. El-Bouhssini, M. Karrou, S. Patil, F. Bassi and M. Baum. 2017. Improving wheat production in the CWANA region. In: *Achieving sustainable cultivation of wheat Volume 2 Cultivation techniques Edited by: Professor Peter Langridge, University of Adelaide, Australia**
- Francis C. Ogonnaya, Awais Rasheed. Emeka C. Okechukwu, Abdulqader Jighly, Farid Makdis, Tadesse Wuletaw, Adel Hagra, Michael I. Uguru, Christian U. Agbo. 2017. Genome-wide association study for agronomic and physiological traits in spring wheat evaluated in a range of heat prone environments. *Theor Appl Genet* DOI 10.1007/s00122-017-2927-z.
- Sahar Bennani, Nasserlehaq Nsarellah, Mohammed Jlibene, Wuletaw Tadesse, Ahmed Birouk Hassan Ouabbou. 2017. Efficiency of drought tolerance indices under different stress severities for bread wheat selection. *AJCS* 11(04):395-405 (2017) ISSN:1835-2707 doi: 10.21475/ajcs.17.11.04.pne272
- W. Tadesse<sup>1,4</sup>, M. Sanchez-Garcia<sup>1</sup>, S. Tawkaz<sup>1</sup>, S. El-Hanafi<sup>1</sup>, A. Sherif<sup>2</sup>, I. Tahir<sup>3</sup>, M. El-Bouhssini<sup>1</sup>, K. Nazari<sup>1</sup>, R. Sharma<sup>1</sup>, Z. Bishaw<sup>1</sup>, A. Niane<sup>1</sup>, S. Assefa<sup>1</sup>, A. Amri<sup>1</sup> and M. Baum. 2017. Wheat Breeding at ICARDA: Strategies, Achievements and Prospects. 13<sup>th</sup> IWGS, Tulln, Austria
- W. Tadesse, S. Tawkaz, S. El-Hanafi, P. Skaf, A. Sherif, M. El-Bouhssini, K. Nazari, R. Sharma, Z. Bishaw S. Assefa, and M. Baum. 2017. Wheat Breeding for Multiple Stresses Tolerance at ICARDA: Achievements and Prospects. Proceedings at the 6<sup>th</sup> ICCN workshop, Agadir 11-15, 2017.
- W. Tadesse<sup>1,4</sup>, O. Abdalla<sup>1</sup>, H. Ketata<sup>1</sup>, S. Tawkaz<sup>1</sup>, S. El-Hanafi<sup>1</sup>, A. Sherif<sup>2</sup>, I. Tahir<sup>3</sup>, Z. Bishaw<sup>1</sup>, A. Niane<sup>1</sup>, S. Assefa<sup>1</sup> and M. Baum<sup>1</sup>. 2017. Strategies and approaches of wheat breeding at ICARDA: a case for Sub Saharan Africa Countries, Abuja, Nigeria

# Thanks

